

Feasibility Study for the Formation of a Renewable Energy Tribal Utility

Viejas Tribal Government

**DOE EERE Tribal Energy Program
Review Meeting**

October 20, 2004



VIEJAS

TRIBAL GOVERNMENT

building a **world** of difference™  **BLACK & VEATCH**



Presenter

Mike Elenbaas
Energy Consultant
Black & Veatch
11401 Lamar Avenue
Overland Park, KS 66211
(913) 458-9196
elenbaasm@bv.com



Project Objective

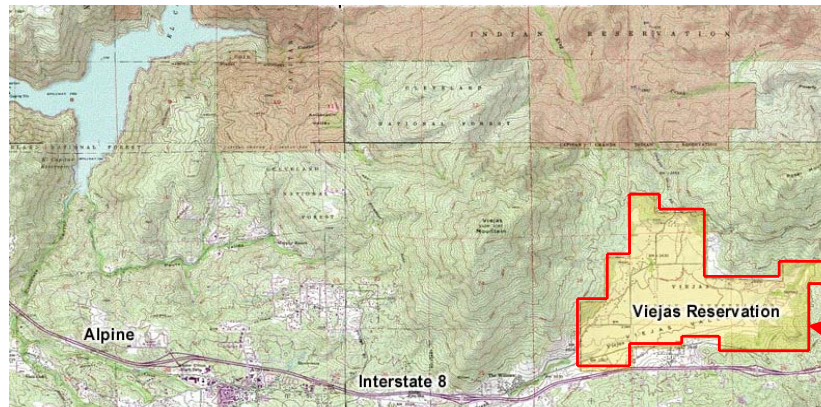
- Investigate the feasibility of forming a renewable energy based tribal utility for the Viejas Tribe.





Overview

- 30 miles east of San Diego
- 1600 acres
- Business enterprises:
 - Gaming
 - Outlet Center
 - Ma Tar Awa RV Parks
 - Alpine Springs Park
- Government Structures
 - General Council
 - Tribal Council
 - Community Gymnasium
 - Education Center
 - Fire Station
 - Senior Citizen Center



Project Location



Project Participants

- Viejas Tribal Government
- Black & Veatch Corporation
- Legal Opinion



Tribal Concerns/Project Drivers

- The Tribe Has Several Concerns Regarding Energy Supply
 - Electric Rates (Price and Stability)
 - Electricity Reliability
 - Energy Independence
 - Local Control
 - Environmental Impacts
- Viejas and Black & Veatch Have Cooperated on Energy Investigations Since 2001

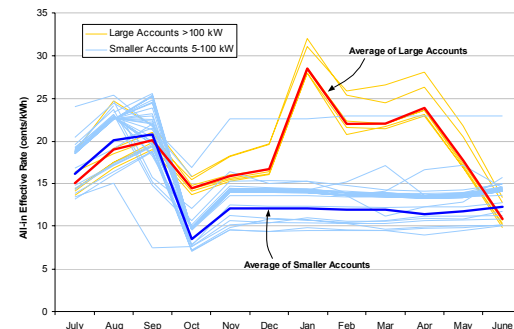


Past Work: Energy Assessment and Utility Formation Studies (2001, 2002)

Conclusions of Previous Work:

- Largest costs and risks involved with forming a utility are associated with:
 - Procurement of electricity from the volatile California energy market
 - Transmission of purchased power to the reservation
- *Local renewable energy resources could address these issues*

Historical Price Volatility:

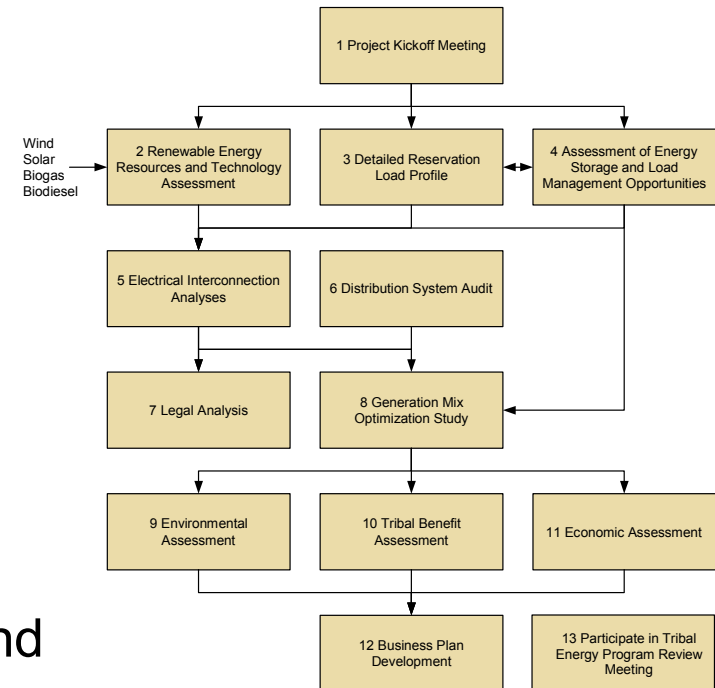




Project Tasks

- Renewable Energy Resources and Technology Assessment
 - Wind
 - Biogas
 - Biodiesel
 - Solar
- Detailed Reservation Load Profile
- Assessment of Energy Storage and Load Management Opportunities

Project Approach Flowchart

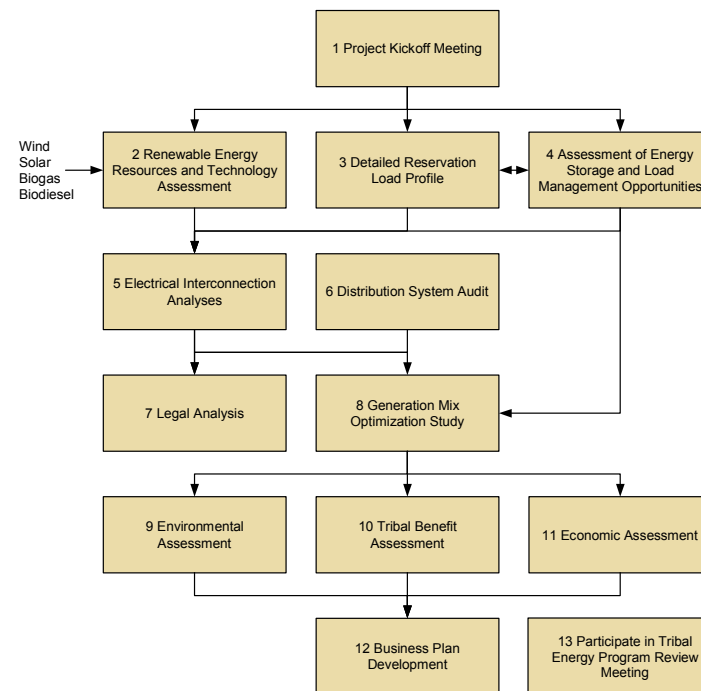




Project Tasks (cont.)

- Electrical Interconnection Analyses
- Distribution System Audit
- Legal Analysis
- Generation Mix Optimization Study – POWRPRO™
- Environmental Analysis
- Tribal Benefit Assessment
- Economic Assessment
- Business Plan Development

Project Approach Flowchart





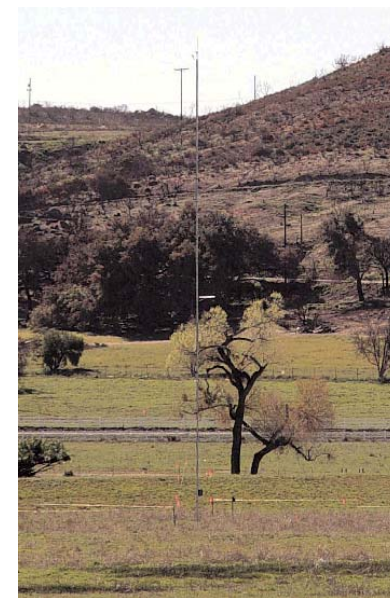
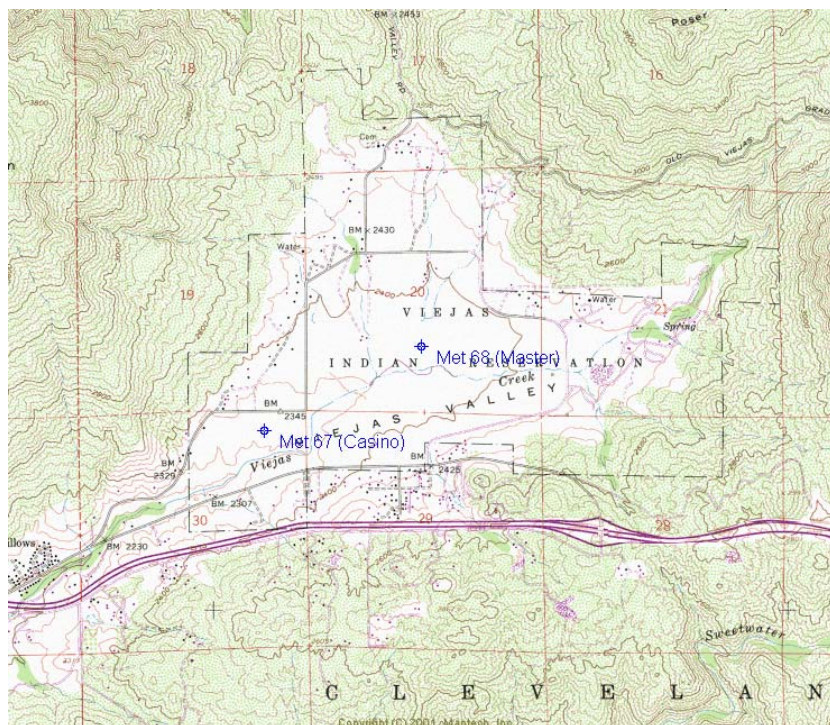
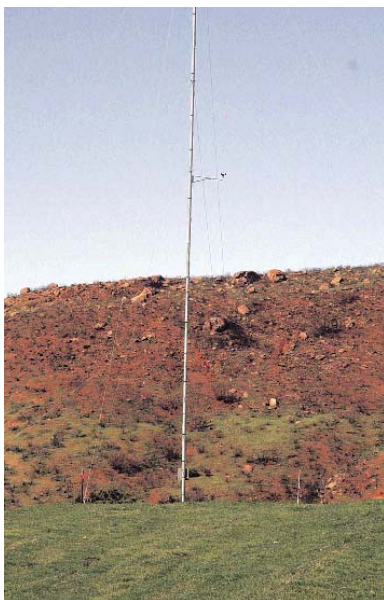
Project Status

- Wind monitoring towers installed in March 2004
 - Wind Data collected on a monthly basis
 - Data Analysis performed quarterly
- Detailed Reservation Load Profile Analysis Complete
- Draft Renewable Energy Resources Technology Assessment Complete
- Generation Mix Optimization Study and other tasks in Progress





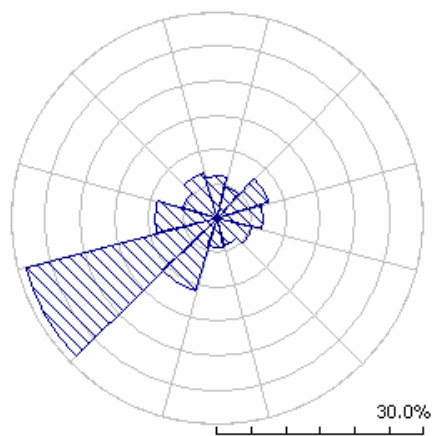
Wind Anemometer Sites



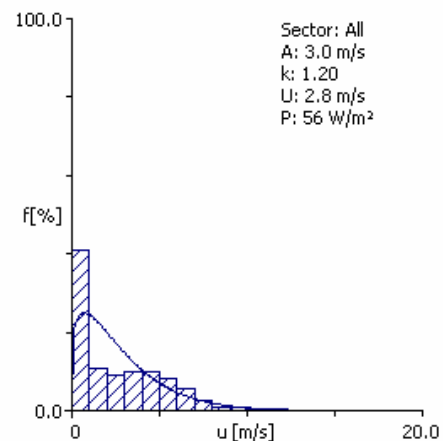


Wind Data Collected and Analyzed

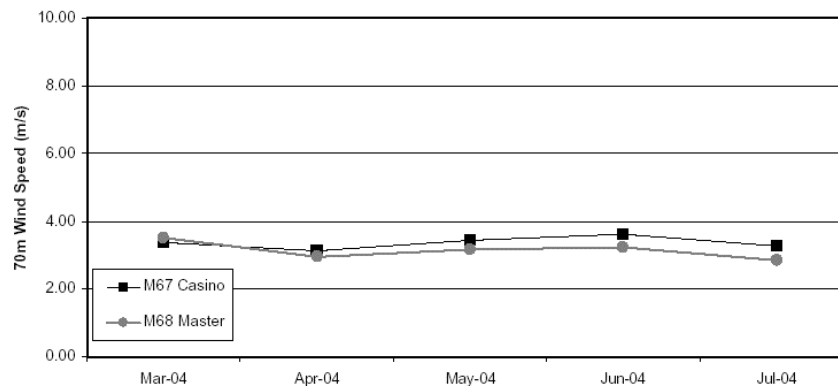
Wind Direction Rose:
M68 Master at 20m



Wind Speed Distribution:
M68 Master at 20m



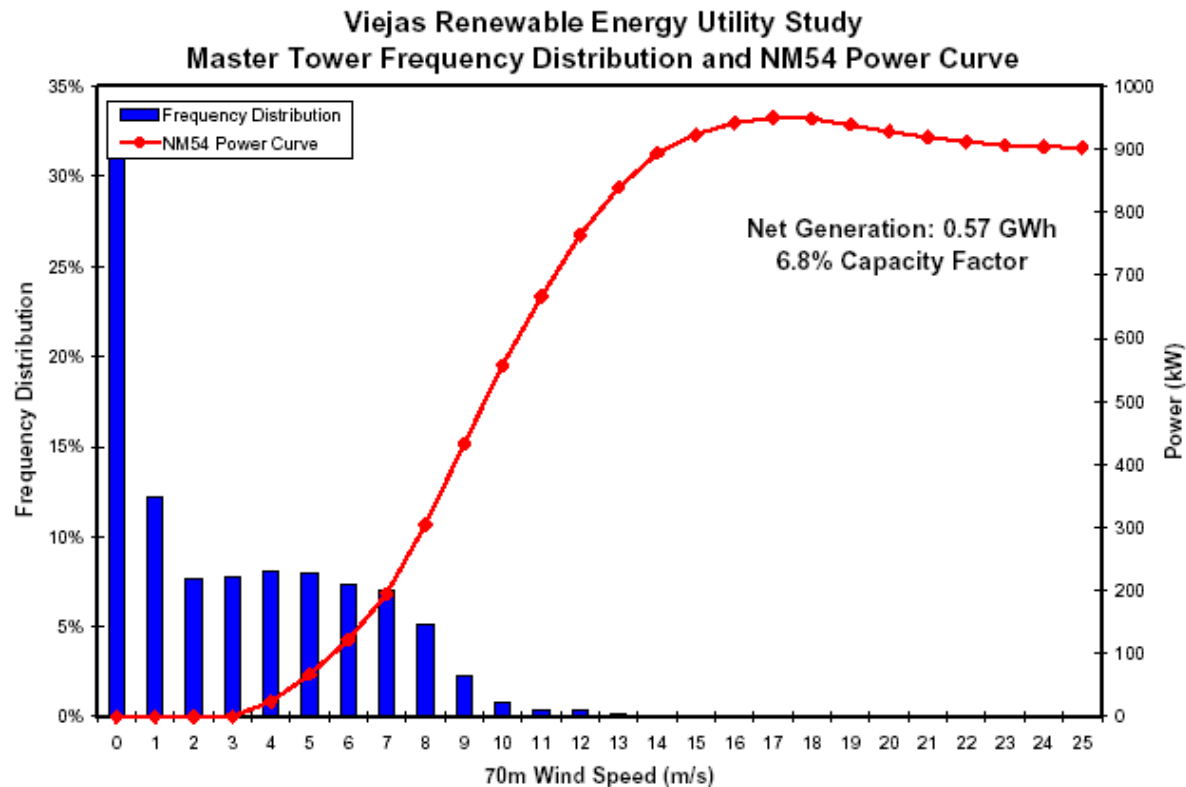
Monthly Average Wind Speeds – 70 m



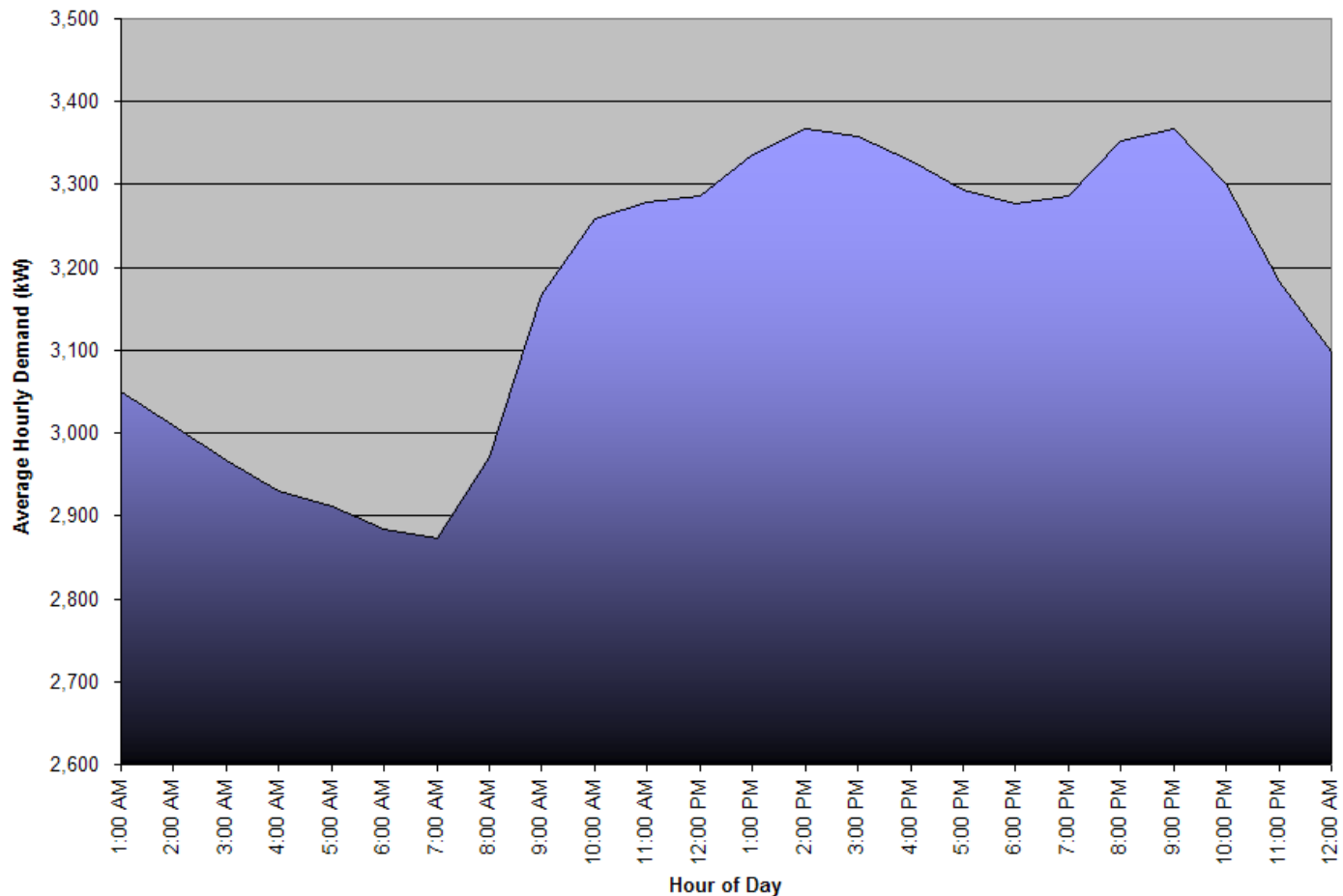
Master Site Frequency Distribution and Power Curve Analysis



Frequency Distribution and Power Curve – Master Site



Average Daily Load Profile of Large Loads on Reservation

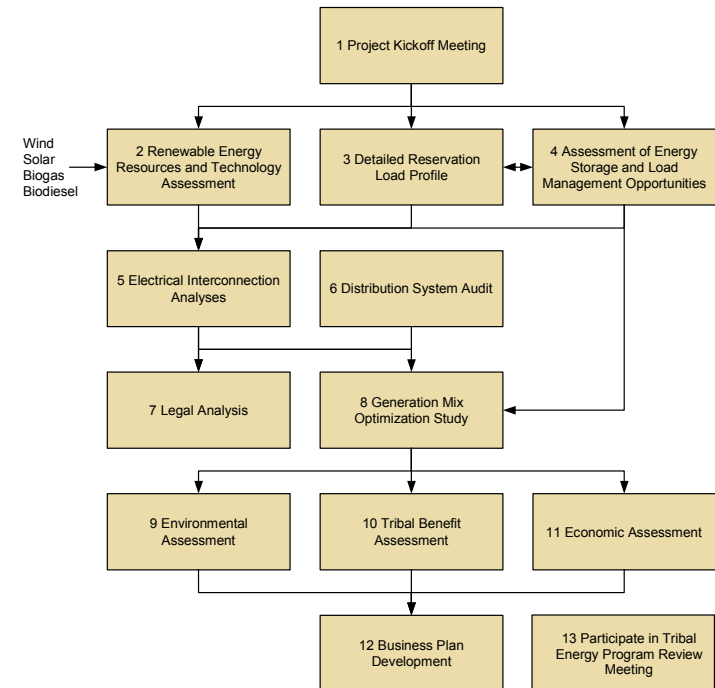




Future Plans

- Generation Mix Optimization Study is being developed using wind data collected to-date, and will be finalized after completion of full year of data collection
- Tasks 4-7 and 9-11 are in progress and will be completed and finalized in the coming months
- Project expected to be completed, May 2005

Project Approach Flowchart





Conclusion

Discussion